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Abstract

This paper investigates the role of good governance to ameliorate, in the long-run term, the effectiveness of foreign aid in terms of economic growth in Maghrebian economies from 1996 to 2014, using the FMOLS and DOLS model. According to the results of the analysis, it was determined that there is a negative relationship between foreign aid and economic growth in the long-run term. However, the effectiveness of aid had ameliorated if countries have good quality of governance, measured by the six dimensions of World Bank Governance. Nevertheless, the most pertinent indicators that ameliorate the aid's effectiveness are Control of Corruption, Voice and Accountability and Quality of Regulation.

Keywords: aid, governance, economic growth, FMOLS, DOLS

1. Introduction

Foreign aid is seen as an important source of economic growth. Even though many studies have investigated the relationship between ODA (official development aid) and economic growth in developing countries, with most reporting mixed results. In fact, several recent studies, typified by the work of Burnside and Dollar (2000), show that foreign aid is more effective in countries having good institutions, this is the conditionality of effectiveness of foreign aid in terms of economic growth. Others argue that aid is more effective with diminishing returns (Hansen and Trap, 2000; Clemens et al., 2004; See Ang, 2010).

Are few the researches that examine the long run between aid, growth and governance, especially in panel model. But, the majority of previous researches have focused on the long run relationship in time series (Bassam (2008); Abd El Hamid Ali (2013). For this reason, our primary goal is to investigate whether good governance, in African countries, has a long-run impact on improvement of effectiveness of foreign aid on economic growth.

Other empirical results, such as those of Dalgaard, Hansen and Tarp 2004, Gomanee, Girma and Morrissey 2005, Bhattarai 2009, Kim 2011, Juselius, Moller and Tarp 2014), also supported the positive impact of foreign aid on economic growth while those of Papanek, 1973, Svensson 1999, Ovaska 2003, Mallik 2008, Alvi, Mukherjee and Shukralla 2008, Herzer and Morrissey 2013 did not corroborate this point of view. As a result, it can be concluded that there is no common empirical evidence that confirms the impact of foreign aid on economic growth.

This study builds on the previous discussion and contributes to the literature in a number of ways, including: (1) to our knowledge, this is the first attempt to have examined the link between foreign aid, economic growth, and governance on a sample of five maghrebian countries. (2) This study not only verifies the effect of foreign aid on economic growth, but also explains whether the effectiveness of development aid in terms of economic growth improves in economies with institutional institutions. (3) There are few empirical studies that studied the effects of governance (as measured by the Kaufmann, Kraay, and Mastruzzi (2010) the six dimensions of governance of the World Bank, such as control of corruption, government effectiveness, political stability, quality of regulation, rule of law and voice and accountability) in improving the effectiveness of foreign aid. In this case, this study uses an iterative approach by calculating a composite index of those six governance's dimensions by the Principal Component Analysis (PCA). Then, we use a disaggregated approach by applying each of the six indicators of good governance. This method is explained by the fact that it exists a correlation between these six indicators.

(4) The majority of previous studies have investigated the long-term direct relationship between foreign aid and economic growth for time series but neglected the role of institutional factors in improving the effectiveness of the long-term aid delivery on a large sample. In this framework, we use two new panel approaches (FMOLS, DOLS) to examine the long-term relationship between foreign aid, economic growth and institutional quality. In fact, the FMOLS estimator takes into account the nuisance parameters and possible autocorrelation and heteroscedasticity phenomena of the residues. It also corrects the endogeneity of the explanatory variables. In addition, to ensure the robust results, we adopt the DOLS approach to eliminate the correlation between regressions and the error term. (5) Previous studies have neglected short-term and long-term causality. For this reason, our work attempts to fill this gap by applying the Granger causality test which is based on the Panel Vector Error Correction Model (VECM).

The rest of the document is organized as follows. Section 2 presents a review of the literature. Then, the paper presents the methodology used and defines the data in section 3. Next, the empirical results and discussions are analyzed in section 4. The last section of the paper provides a conclusion and policy implications.

2. Review of the literature

It is necessary to note that financing the economy includes all the ways in which economic agents obtain the funds they need to carry out their activities. So, it is realized in two different ways: internal and/or external: the Internal financing is carried out by savings (Perkins et al, 2008), but the external one is achieved through the use of the monetary and financial system, indebtedness, etc. Also, financing may be private (FDI, debt, donations,…) or public (development aid,…).So, foreign aid represents the important source of financing for many countries, especially the poor ones.

Over the last few decades, the domestic capital needed to ameliorate economic growth in developing countries, especially the Maghrebian ones, is insufficient. In this case, those countries have received a massive amount of development aid in order to promote economic growth and mitigate poverty (World Bank, 2013). However, those objectives have not been achieved. So, we talk about the ineffectiveness of foreign aid. This ineffectiveness is explained, specially, by the bad management (Boone, 1996) and the bad quality of governance. Boone (1996) affirms that relationship between Foreign Aid and economic development is not significant for two reasons: firstly, capital shortage doesn't cause poverty; secondly, if there is a large flow of aid, it is not optimal for politicians to adjust distortion

policies. For relationship between international aid and corruption, some researches investigate that aid increases corruption (Asongu & Jellal (2013); Asongu (2014b)).

Mosley (1980) and Taslim and Weliwita (2000) investigated that foreign aid had a negative effects on domestic savings. Similarly, Snyder (2000), Shields (2007) and Ouattara (2008) confirm the existence for a negative relationship between international aid and saving.

Indeed, Mallik (2008) examined the effectiveness of foreign aid for economic growth in the six poorest and most aid-dependent African countries, such as Central African Republic, Malawi, Mali, Niger. Sierra Leone and Togo. Using the co-integration analysis, Mallik (2008) found that there is a long-term negative relationship between real GDP per capita and aid, as a percentage of GDP, investment, as a percentage of GDP and openness. Using simultaneous equations, Burke and Ahmadi-Esfahani (2006) reversed the thesis of aid effectiveness in terms of economic growth for the case of Thailand, Indonesia and the Philippines, between 1970 and 2000. Moreover, Khan and Ahmed (2007) conducted a study to answer the question of whether foreign aid is a blessing or a curse for Pakistan, using the ARDL approach. They found that foreign aid has a negative effect on economic growth. Other similar empirical studies such as those of Svensson 1999, Ovaska 2003, Mallik 2008 and Ang 2010, have strongly suggested that foreign aid has a negative effect on economic growth .

However, we find studies in favor of the positive effects of aid on growth (Arndt et al., 2010; Juselius et al., 2014). In fact, Addison et al. (2005) showed that foreign Aid has a positive impact on growth and increases pro-poor public expenditure. According to these authors, foreign Aid broadly works largely to eliminate poverty, and, in the absence of aid, poverty would be higher. Also, Arndt, Jones, and Tarp (2014) investigate that aid has promoted growth and decreased poverty and infant mortality.

In addition, others researches focused on the relationship between aid and corruption. In fact, Asongu&Jellal (2013) investigated that international Aid channeled through private investment and tax effort decreases corruption. Similarly, Okada & Samreth (2012) claim that corruption can be reduced by official development aid.

Recently, Abd El Hamid Ali (2013) has studied the effectiveness of international aid for the case of Egypt during the period 1970-2010. More precisely, she has examined the long-term relationship between foreign aid and economic growth using the Johansen Cointegration Test and the Vector Error Correction Model (VECM). She found a negative and significant impact of foreign aid on short- and long-term economic growth. More recently, Arndt et al. (2015) have confirmed a positive impact of foreign aid on economic growth, including its effect on

the immediate sources of growth (physical and human capital), on well-being indicators (poverty and child mortality) and measures of economic transformation (the share of agriculture and industry in the value added). Juselius, Moller and Tarp (2014) examined a long-term foreign aid relationship on key macroeconomic variables for a sample of 36 sub-Saharan African countries covering the period 1960-2007 using the VAR model. They confirmed the thesis of the effectiveness of long-term aid on macroeconomic variables. Regarding Arndt et al. (2015), they showed that development aid helps stimulate economic growth, promote structural change, improve social indicators and reduce poverty. In addition, Moolio and Kong (2016) investigated the long-term relationship between foreign aid and economic growth by applying co-integration tests for panel data on a sample of four countries (Cambodia, Laos, Myanmar , Vietnam) of the ASEAN region for the period 1997-2014. As for Moolio and Kong (2016), by applying both the FMOLS and DOLS models, they concluded that in the long term foreign aid has a favorable effect on economic growth. Similarly, Irandoust and Ericsson (2005) showed a positive and significant relationship between foreign aid and economic growth for the African countries. They based their research on a sample of four African countries, those most benefiting from foreign aid in Africa, such as Niger, Nigeria, Rwanda, Senegal, and Togo, during the period between 1965 and 2000.

However, some other studies have supported the idea that the effectiveness of foreign aid in terms of economic growth is conditional. These conditions include sound macroeconomic policies, democracy, institutional quality and governance, financial liberalization, and so on. According to a 1998 World Bank's foreign aid study, this variable has a positive impact on economic growth in recipient countries with sound fiscal, monetary and trade policies. Similarly, some researchers argue that foreign aid can contribute to economic growth, but only in countries with a good political environment (Burnside and Dollar 2000, Collier and Dollar 2002, Bhattarai 2009). Other researchers found that the foreign aid variable has a positive impact on economic growth, depending on the levels of democracy (Svensson 1999, Islam 2003) and financial liberalization (Ang 2010, Nkusu and Sayek 2004).

In the same context, Ali and Isse (2005) studied the impact of foreign aid on economic growth. They found that foreign aid has a negative impact on economic growth. After studying the interaction between the foreign aid variable and the policy, they found that foreign aid promotes economic growth. Therefore, they suggested that the effectiveness of foreign aid in terms of growth is conditional on the existence of good policies. On the other hand, Rajan and Subramanian (2008) refuted the thesis of the effectiveness of foreign aid in the presence of a good political environment, showing that the effect of foreign aid on

economic growth remains negative even by introducing the interaction variable between foreign help and the adopted policies.

Other research studies have tried to examine the direct effect of foreign aid on corporate governance. For example, Bräutigam and Knack (2004) examined the relationship between foreign aid, institutions and corporate governance in 32 countries of sub-Saharan Africa, using the OLS methods and the double OLS. They found that foreign aid has worsened the quality of governance. In addition, they pointed out that large amounts of foreign aid can weaken the institutions and create incentives for aid agencies. This study was also supported by Sarwar, Hassan and Mahmood (2015) who showed that foreign aid is negatively and significantly correlated with corporate governance. In addition, foreign aid is associated with the deterioration of political and economic institutions. Other studies suggested that foreign aid increases the size of governments (Boone 1996, 2000).

3. Model Specification and Data Description

In literature, there are three streams of thought: the first suggests that ODA promotes economic growth in the recipient countries. Nevertheless, the second current suggests that ODA has a negative impact on economic growth in the sense that foreign aid impedes investment and only increases consumer spending. On the other hand, the latest thinking shows that the effectiveness of foreign aid improves only in countries with sound institutional policies.

Our econometric study aims to provide answers to the questions of the relationship between foreign aid and economic growth in five Maghrebian countries. In this case, we will estimate the first model (equation 1) where economic growth (GDP per capita) is treated as a dependent variable, while development of foreign aid is the main independent variable alongside other variables (inflation, money supply, trade openness, population). Thus, the main question in this work is whether corporate governance has an important role in improving the effectiveness of the development of foreign aid in terms of economic growth. In order to answer this question, equation 2 will be estimated.

Thus, to study the effectiveness of the development of foreign aid in the long term, in terms of economic growth, we consider a sample composed of 5 maghrebian countries over the period from 1996 to 2014. In a first place, we will estimate the following model:

$$Y_{it} = \beta_0 + \alpha_1 ODA_{it} + \alpha_2 X_{it} + \varepsilon_{it} \qquad (1)$$

Our dependent variable is"Y" that is the log of GDP per capita in current US dollars, while the

explanatory variables are: ODA is the log of the amount of the currently received US net aid per capita (McGillivray et al., 2006), "X" is the set of the explanatory variables, which includes the following variables: M2 is logarithm of monetary mass measured by money and quasi money as % of GDP) (Burnside and Dollar, 1997), Pop refers to population growth (annual%) (Ekanayake and Chatrna, 2010) which is a proxy for the labor force related to GDP (%) (McGillivray et al., 2006, Gries et al., 2009), Inf refers to inflation, which is approximated by the Consumer Price Index (McGillivray et al., 2006), open is the the trade opening that is measured by the sum of export and import relative to GDP(%) (McGillivray et al., 2006; Gries et al., 2009); oda2 is the square of aid (McGillivray et al., 2006). This variable was introduced to take into account the possibility of non-linearity of the link between aid and economic growth, theoretically based on the law of diminishing productivity of capital (Hansen and Tarp 2000, Clemens et al., 2004)., β is a constant; ε designates the model error term; α represents the parameters to be estimated.

In a second place, we will examine the effectiveness of the development of aid in the presence of governance. In this framework, we will introduce into our model the variable "Gov" measured by the composite index of governance indicators of Kaufmann, Kraay and Mastruzzi (2010) (Voice and Accountability (VA), Government Effectiveness (GE), Political Stability (PS), Quality of Regulation (QR), Control of Corruption (CC), Rule of Law (RL)), by applying Principal Components Analysis (PCA), as well as the variable "ODA * Gov" represents the interaction between development aid and governance. The interaction of this variable gives us an idea of how much aid effectiveness in terms of economic growth improves in the presence of good institutional quality. The expected sign of this variable is positive in the sense that the effectiveness of international aid is improving in countries with sound economic policies.

So, we re-estimate our model by applying the variable "gov" and the interaction between governance and aid "odagov". The model to estimate at this stage is as follows:

$$Y_{it} = \beta_0 + \alpha_1 ODA_{it} + \alpha_2 X_{it} + \alpha_3 ODA * Gov_{it} + \alpha_4 Gov_{it} + \varepsilon_{it} \qquad (2)$$

3.1. Sources of data

The dataset is a non-cylindrical panel includes five Maghrebian countries for the period 1996-2014. The selection of countries and the study period were limited by the availability of data. All the variables were taken from the World Bank statistics with the exception of the governance variable, which was derived from World Governance Indicators (WGI) while the

inflation variable was obtained from International Financial Statistics (IFS). Table 1 summarizes the sources of our data.

Table1. Data and source

4. Results and discussion

Before proceeding to the long-run relationship between aid and growth, examining the unit-root properties of all the series in the study is the first step. The variables in this study should be integrated at the same order, in order to produce the FMOLS and DOLS tests. To study the stationarity properties of the variables, the Levin and al. (2002) and Im and al. (2003) tests are conducted. The study of Levin et al. (2002), Levin-Lin-Chu (LLC)) is structured around the panel Dickey-Fuller augmented panel (ADF) tests, which assume that there is a homogeneity in the dynamics of the autoregressive coefficients with inter-individual independence between the residues. The next step involves testing the presence of a long-term relationship between the series. In this paper the panel cointegration tests (Pedroni's test (2004) and Kao's test employed the residual of Phillips and Perron (1988) and Dickey and Fuller (1979)) are employed.

4.1. Economic growth aid

The unit-root properties are investigated by applying the Levin, Lin & Chu t (2002) and Im, Pesaran and Shin W-stat (2003) tests. The finding of unit-root tests are reported in table 2. The empirical evidence supports all the variables to be stationary in first difference. So, we can suggest all the variables to be integrated at order one, I(1).

Table 2. Panel unit root tests results

Due to the same integrating order of all the series, it is appropriate to implement Pedroni's (2004) tests in order to examine the existence of the long-run relationship among the variables.

Regarding the analysis of co-integration (table (3)), Pedroni's (2004) tests enabled us to analyze it in the context of this study. The set of alternative co-integration test hypotheses is accepted. As a result, these tests confirm the rejection of the null hypothesis of no co-integration since the results of these tests confirm the existence of a co-integration relationship between the variables.

Table 3.Cointegration tests results

According to the usual tests of the unit root on the time series, all the series used in our study are integrated of the same order. On the other hand, the co-integration test revealed the existence of a long-term relationship in our model, which enables us to estimate our FMOLS and DOLS models.

Table 4 . Panel FMOLS and DOLS results

The results of the estimation of the FMOLS and DOLS models are presented in table 4. Moreover, the coefficients estimated from these two models can be used as long-term elasticities. It is obvious to note that the coefficients estimated from the two models FMOLS and DOLS models are very close and have the same signs. Indeed, from the results presented in table 4, we found that the coefficients obtained from the regression are statistically significant at 1% level of significance except for the case of trade openness and the ODA2.

Regarding development of foreign aid, its coefficient is negative and significant at 10% and 5% level in the FMOLS and DOLS models, respectively. So, we can point out that in the long term, foreign aid has a negative effect on economic growth in the region. In fact, foreign aid decrease the investment of the recipient countries, discourage the financing of several projects in all the fields and increase the consumption expenditures. These results oppose those of Juselius, Moller and Tarp (2014) and Moolio and Kong (2016).

Besides, our empirical research shows that inflation has a positive effect on economic growth. Indeed, the coefficient of inflation shows that an increase of 1% will raise economic growth between 0.468436% and 0.422373% in long run via FMOLS and DOLS respectively.

On the other hand, when the money supply increases by 1%, economic growth increases by 0.304743% and 0.234678%, respectively, for the two models FMOLS and DOLS. Similarly, the labor force measured by the rate of population growth positively affects economic growth. The variable labor force measured by the annual population growth (pop) is significant only in the FMOLS model. For the others explanatory variables “oda2” and “ouv”, they are not significant in the DOLS and FMOLS models. So; we conclude the absence of correlation between these variable and the economic growth, the results infirm these of Burnside and Dollar (2000).

4.3. Effectiveness of foreign aid in the presence of governance

To test the existence of a long-term relationship between the development of foreign aid and economic growth in the presence of governance, we will estimate, at this stage, equation 2. Thus, we apply, in the first place, the KAO test to check the existence of a co-integration relationship between the studied variables. The results of this test show that the probability associated with T-statistics (0.0044) is less than 5%, which makes it possible to reject the null hypothesis of no co-integration. This implies the existence of a long-run relationship between foreign aid and economic growth in the presence of governance in the Maghrebian economies.

As explained previously, the expected sign of "α1" is ambiguous. If "α1">0, the conventional view that international assistance for development drives growth holds. Alternatively, "α1"<0 implies support for unconventional vision, in which case increase in international aid for development is associated, in the long-run, with complacency and indifference behavior leading to a decline in economic growth. The expected sign of "α4", which represents the direct effect of the governance quality on economic activity, in the long term, is also theoretically ambiguous. The expected sign of the coefficient of the interaction term "α3" is also uncertain for reasons previously discussed, and is ultimately an empirical question. If "α3" has the same sign as "α1", then the direct effect of aid, in the long term, will be reinforced at higher levels of governance quality. On the other hand, if "α3" and α1are of opposite signs, more improvement of governance quality will weaken the direct effect of international aid, in the long-run.

The results of the FMOLS and DOLS regression are presented in table (6) that indicates that equation (2) is tested using the composite index of six governance indicators. Aid is effective in terms of economic growth, in the long-run, in the presence of governance, if and only if the coefficient of the variable of the interaction between aid and governance (that is, the coefficient of the variable "ODA*GOV") is statistically positive and significant. Indeed, the results of the regressions presented in the tables (6) show that the evidence in favor of aid raising growth, in long term, only in good policy environments remains inconclusive. The results presents in table (6) show that the effectiveness of foreign aid increases, in the long-run, in presence of governance. In fact, the interaction term coefficient is only significant in the DOLS model. Indeed, the coefficient of aid-governance interaction in Model 2 (0.1447 for DOLS) is higher than the coefficient of aid in Model 1 (-0,1988).

For the other explanatory variables: the coefficients of inflation (INF) and money supply (M2) are significantly and positively correlated in the long run to economic growth and they retain the same signs as in Model 1 except for the case of inflation in the FMOLS model, the coefficient is not significant. The coefficient of trade openness is significant only for the DOLS model, but when trade openness increases in the long run by 1%, economic growth increases by 0.633%. This means that an enhancement of liberalization process leads to a positive influence on economic performance. Therefore, liberalization will facilitate the transfer of technologies witch improve the productivity; it therefore has a positive impact on economic growth. These findings are in line with those of Tiba et al (2015).

Nevertheless, it is evident that the majority of elasticity of these variables relative to economic growth has decreased compared to those found in Model 1 in both the FMOLS and DOLS models.

Tableau 5. KAO test results

Table 6. Aid, growth and governance: long-run relationship

4.5. Effectiveness of foreign aid in presence of six indicators of governance

In order to test the conjecture that aid is more effective when specific macroeconomic policies are in place, we use the variable "governance", measured by the composite component of the six dimensions of governance of World Bank. In this part, we will try to identify what the more pertinent indicator that can ameliorate, in the long term, the effectiveness of foreign aid in terms of economic growth. So, we will estimate the long-term effect of aid on growth in presence of each dimensions of governance. In this case, the variable "gov" in our model (eq 2) denotes each of the six indicators of good governance. So, we have six specifications (M1, M2, M3, M4, M5 and M6) where we include these indicators (political Stability, quality of regulation, Voice and Accountability, Control of Corruption, rule of law, government effectiveness), respectively, in the FMOLS model. We have, also, six specifications (M7, M8, M9, M10, M11 and M12) where we include these same indicators, in the DOLS model

We note that the 6 variables of interaction between foreign aid and each indicators of governance in the FMOLS model are not significant for the whole panel. At this stage, we can't conclude that institutions play a significant role in the amelioration of effectiveness of foreign aid, in the long-run of our entire panel. However, all these variables are significant at one percent level, in the DOLS model. So, we can say that the effectiveness of foreign aid in terms of economic growth is ameliorated in the presence of governance, measured by the six dimensions of World Bank Governance. Nevertheless, the results of table (8) show that the most pertinent indicators that ameliorate the aid's effectiveness are "Control of Corruption", "Voice and Accountability" and "Quality of Regulation" whose coefficients are 0,620; 0,510 and 0,537, respectively.

Table 8: DOLS test results

Table 7: FMOLS test results

5. Conclusion and political implications

The work of descriptive and econometric analysis above is a contribution to the debate on effectiveness of foreign aid, in the long-run, in presence of governance in Maghreb countries. The results of our studies based on a sample of five maghrebian countries, permit us to conclude as Burnside and Dollar (2000) and Abd El Hamid Ali (2013) on high significance in the relationship between "good governance" and effectiveness of international aid in terms of economic growth: We found that, in the DOLS model -as opposed to the FMOLS model-, the conjecture that aid is more effective when specific macroeconomic policies are in place is confirmed.

Despite a substantial aid effectiveness literature, we still know little about the long-run relationship between aid, growth and governance. Our analysis points to the need for further research aimed at identifying the effectiveness of aid in presence of governance over relevant time periods on a panel data

Panel regressions confirm the cross-sectional results: an increase in average foreign aid of 1 percentage point of GDP is associated with average per capita GDP growth 19 years later that is higher by 0.2 percentage points.

In recent decades, economic theory has largely emphasized the effectiveness of foreign aid, with the majority of cases indicating that this effectiveness improves with the presence of a sound institutional framework.

In fact, the major objective of the developing countries, especially the Maghrebian ones, is to reach the developed countries, improve economic growth and reduce poverty. Thus, our document brings this dilemma to highlight the improvement of the effectiveness of foreign aid development, especially in the long term, in the presence of good governance. In an effort to address this problem, the purpose of this paper is to examine the link between foreign aid and economic growth in the presence of governance on a panel model of five Maghrebian countries from 1996 to 2014 using the FMOLS and DOLS models. The results show that foreign aid development improves economic growth in the presence of long-term institutional quality. On the other hand, we test the causality between the effectiveness of foreign aid development and economic growth. In fact, we found that there is a long causality between the studied phenomena.

Thus, the policy implications of our study suggest that the institutional factor plays a key role over time in helping the Maghreb countries to improve the effectiveness of development assistance in terms of economic growth. In other words, long-term development assistance

promotes economic growth, but this efficiency improves with the presence of a healthy institutional environment.

Therefore, given the importance of the quality of governance in improving the effectiveness of the ODA, it is essential to focus on the application of the principles of governance. Indeed, international aid is well used in a country characterized by transparent, accountable and enforced institutions of laws and regulations by ensuring the participation of both the stakeholders and the civil society.

In fact, no one can deny that a good governance in Maghreb at all levels in the political, social and economic spheres is crucial for the promotion of growth and the development and achievement of the Millennium Development Goals. On the other hand, the contagion of a culture of good governance is crucial for a rational economic management, an effective service delivery and an empowerment of the people.

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TABLES

Table1. Data and source

Variable	Definition	Source
GDP	The GDP per capita in current US dollars	World bank
ODA	the amount of US current received net aid per capita	World bank
ODA2	the square of aid	World bank
Open	The trade opening that is measured by the sum of export and import relative to GDP(%)	World bank
M2	The monetary mass measured by money and quasi money as % of GDP	World bank
Pop	The population growth (annual %)	World bank
Gov	It is a synthetic measure of the quality of governance of countries by weighting and aggregation of different scores presented by Kaufman et al. (2010) using Principal Component Analysis. This measure integrates six indicators into a composite index that takes into account: 1) political stability; 2) Voice and accountability; 3) the effectiveness of public authorities; 4) the quality of regulation; 5) the rule of law and 6) the control of corruption.	Author's calculation
Inf	The rate of inflation calculated on the basis of the consumer price index	International Financial Statistics (IFS)

Table 2. Panel unit root tests results

	Level		first difference	
	Levin, Lin & Chu t	Im, Pesaran and Shin W-stat	Levin, Lin & Chu t	Im, Pesaran and Shin W-stat
GDP	-0.23462	2.21012	-14.3889***	-13.0184***
	0.4073	0.9865	0.0000	0.0000
ODA	-4.83987***	-2.08570**	-20.4395***	-17.5427***
	0.0000	0.0185	0.0000	0.0000
Open	-2.43345***	-1.05580	-18.8392***	-16.7181***
	0.0075	0.1455	0.0000	0.0000
M2	-3.86707***	-0.05203	-16.5003***	-12.5029***
	0.0001	0.4793	0.0000	0.0000
Inf	1.07026	-9.03214***	-14.8067***	-15.5248***
	0.8577	0.0000	0.0000	0.0000
Pop	-1.87220**	-4.67160***	-11.2724***	-14.3048***
	0.0306	0.0000	0.0000	0.0000
Gov	-10.8107***	-1.89320**	-19.8363***	-7.65558***
	(0.0000)	(0.0292)	(0.0000)	(0.0000)

***, **, and * indicates statistically significant at the 1, 5 and 10 percent levels respectively

Table 3.Cointegration tests results

within-dimension				
	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-0.314305	0.6234	-3.717569	0.9999
Panel rho-Statistic	8.662106	1.0000	8.419623	1.0000
Panel PP-Statistic	-1.658877	0.0486	-6.959101	0.0000
Panel ADF-Statistic	-2.596041	0.0047	-5.333413	0.0000
between-dimension				
	Statistic	Prob.		
Group rho-Statistic	10.45125	1.0000		
Group PP-Statistic	-18.84457	0.0000		
Group ADF-Statistic	-7.528286	0.0000		

***, **, and * indicates statistically significant at the 1, 5 and 10 percent levels respectively

Table 4 . Panel FMOLS and DOLS results

	INF	M2	ODA	ODA2	POP	OUV
FMOLS	0.468436***	0.304743***	-0.294640***	0.007163	-0.092122*	-0.207713
	0.0000	0.0001	0.0023	0.6153	0.0178	0.1021
DOLS	0.422373***	0.234678***	-0.198847**	0.002064	-0.055004	-0.212850
	0.0000	0.0024	0.0403	0.8858	0.1629	0.1030

***, **, and * indicates statistically significant at the 1, 5 and 10 percent levels respectively

Tableau 5. KAO test results

	t-Statistic	Prob.
ADF	-2.617358	0.0044

*** indicates statistically significant at the 1 percent level

Table 6. Aid, growth and governance: long-run relationship

	INF	M2	ODA	ODA2	POP	OUV	ODAGOV	GOV
FMOLS	0.970542***	0.095311	0.081611	-0.004319	0.015806	-0.375514***	**0.006339**	0.181623
	0.0000	0.1448	0.4750	0.7563	0.7546	0.0004	0.8734	0.3284
DOLS	0.444676***	0.235213***	0.375514***	-0.017975	-0.030500	-0.151123	**0.144745*** **	-0.633201***
	0.0000	0.0013	0.0030	0.2587	0.4637	0.2364	0.0028	0.0024

***, **, and * indicates statistically significant at the 1, 5 and 10 percent levels respectively

Table 7: FMOLS test results

	M1	M2	M3	M4	M5	M6
ODA	0.989451	0.327035	1.168997	0.745941	0.843735	0.786036
	0.3944	0.7856	0.2996	0.4775	0.4415	0.4633
ODA2	-0.166245	0.030102	-0.147907	-0.031684	-0.161237	-0.131263
	0.3020	0.8849	0.3181	0.8401	0.3796	0.4697
odaPS	**0.041213**					
	0.9246					
PS	0.010691					
	0.9950					
odaQR		**0.838567**				
		0.2842				
QR		-3.138483				
		0.3168				
odaVA			**0.423495**			
			0.4370			
VA			-1.478863			
			0.4964			
odaCC				**0.977804**		
				0.1598		
CC				-3.641420		
				0.1777		
odaRL					**-0.112154**	
					0.8712	
RL					0.604649	
					0.8222	
odaEG						**0.003902**
						0.9947
EG						0.108311
						0.9623
OUV	0.162580	0.121884	0.019865	-0.192950	0.125388	0.135682
	0.7818	0.8354	0.9751	0.7306	0.8255	0.8197
POP	-0.222270	-0.225974	-0.229120	-0.227572	-0.242009	-0.216516
	0.4090	0.4182	0.3919	0.3587	0.3721	0.4335
INF	1.118550*	0.951665*	0.859370	0.834741	1.171059**	1.079382*
	0.0558	0.0736	0.1550	0.1285	0.0412	0.0597
M2	0.123898	0.222488	0.205884	0.249622	0.244739	0.260760
	0.7544	0.5033	0.5483	0.4622	0.4913	0.4344

***, **, and * indicates statistically significant at the 1, 5 and 10 percent levels respectively

Table 8: DOLS test results

	M7	M8	M9	M10	M11	M12
ODA	0.411335**	0.490756***	0.485109***	0.515632***	0.470974***	0.459166**
	0.0339	0.0062	0.0094	0.0040	0.0092	0.0102
ODA2	-0.067610**	-0.068084***	-0.064947**	-0.070268***	-0.061861**	-0.063596**
	0.0146	0.0064	0.0146	0.0055	0.0150	0.0114
odaPS	**0.251551*** **					
	0.0001					
PS	-0.648572***					
	0.0009					
odaQR		**0.537408*** **				
		0.0000				
QR		-1.472638***				
		0.0000				
odaVA			**0.510311*** **			
			0.0000			
VA			-1.455910***			
			0.0000			
odaCC				**0.620023*** **		
				0.0000		
CC				-1.628338***		
				0.0000		
odaRL					**0.491870*** **	
					0.0000	
RL					-1.425865***	
					0.0000	
odaEG						**0.478926*** **
						0.0000
EG						-1.264374***
						0.0000
OUV	1.014162***	0.823726***	0.781128***	0.764706***	0.782762***	0.813837***
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
POP	-0.128996*	-0.120755	-0.146351	-0.110293	-0.156912	-0.103397
	0.0591	0.0650	0.0241	0.0989	0.0186	0.1174
INF	0.709791***	0.703929***	0.675924***	0.735252***	0.693579***	0.724492***
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
M2	0.824667***	0.801426***	0.829942***	0.767246***	0.830415***	0.797394***
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

***, **, and * indicates statistically significant at the 1, 5 and 10 percent levels respectively